Landsat 7 Image Assessment System (IAS) Transition Plan

May, 1997

GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

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List of TBDs/TBRs

1. Software maintenance tracking tool to be used by EDC DHF : Sections 1.8 and 3.4.3

2. IAS training to be provided by GSFC IAS Project: Sections 3.2.1, 3.2.1.2, 3.2.1.3

3. Dates of IAS acceptance documentation from EDC DHF: Table 3-1 in section 3.1

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Abstract

This *Landsat 7 Image Assessment System (IAS) Transition Plan* describes the requirements for phasing IAS implementation activities from development into operations and maintenance (O&M). This plan defines the responsibilities of Goddard Spaceflight Center (GSFC) IAS Project personnel and the activities required of them to successfully transition the IAS to Landsat 7 mission operations at the EROS Data Center (EDC) Data Handling Facility (DHF). This plan also describes the responsibilities of EDC DHF personnel and their activities to support and/or perform IAS transition.

This plan provides a joint understanding of IAS transition planning, preparation, conduct, and close-out as envisioned by the GSFC IAS Project and EDC DHF. This plan has been reviewed by and negotiated with the EDC DHF and updated accordingly to reflect the agreements reached during the review meetings. It will be updated and baselined approximately 30 days before the delivery of IAS Release 1 to the EDC DHF.

Keywords: Landsat 7 Image Assessment System (IAS), EROS Data Center (EDC), transition plan

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Preface

This transition plan outlines and describes Landsat 7 Image Assessment System (IAS) transition activities, responsibilities, and products and provides a schedule for accomplishing the transition.

This transition plan is controlled by the GSFC IAS Project and may be updated by document change notice (DCN) and/or revision procedures in effect on the GSFC IAS Project. Comments and questions regarding this plan should be directed to

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Section 1—Introduction

1.1 Purpose

This document defines the transition activities, responsibilities, and products required to turn over the Landsat 7 Image Assessment System (IAS) from the IAS Project at the National Aeronautics and Space Administration's (NASA) Goddard Space Flight Center (GSFC) to the Earth Resources Observation System (EROS) Data Center (EDC) Data Handling Facility (DHF). This document defines specific responsibilities of GSFC IAS Project and EDC DHF personnel for performing and/or supporting IAS transition activities.

1.2 Scope

This document is limited to the identification of the roles, responsibilities, schedules, expectations, and assumptions between NASA GSFC and EDC DHF necessary to transition the IAS from its development environment at GSFC in Greenbelt, Maryland, to the Landsat 7 mission operations environment at the EDC DHF in Sioux Falls, South Dakota.

1.3 Landsat 7 Image Assessment System

The IAS primarily consists of an SGI Origin 2000 multi-processor server with disk and tape storage, 3 SGI Origin O2 workstations, a printer, and associated FDDI and Ethernet networks.

The software component of the IAS consists of five subsystems (major functions):

1. Process Control Subsystem (PCS)
2. Data Management Subsystem (DMS)
3. Evaluation and Analysis Subsystem (EAS)
4. Radiometric Processing Subsystem (RPS)
5. Geometric Processing Subsystem (GPS)

Details on configuring the IAS and performing IAS functions are contained in the IAS User's Guide and the IAS Operations and Maintenance Manual. Detailed information on IAS design are contained in the IAS System Design Specification and the IAS Critical Design Specification. All of these documents are listed in Section 2.2

1.4 EROS Data Center

The EDC is a U.S. Geological Survey (USGS) National Mapping Division data management, systems development, and research field center located near Sioux Falls, South Dakota. It was established in the early 1970s to receive, process, and distribute data from NASA Land Satellites. The EDC currently holds the world's largest collection of space- and aircraft-acquired imagery of the Earth.

The EDC DHF will be the primary site for receiving real-time and recorded ETM+ imagery from Landsat 7. The following Landsat 7 ground system elements and other support systems will be installed at the EDC DHF:

- LPS
- Landsat Ground Station (LGS)
- Image Assessment System (IAS)
- Level 1 Product Generation System (LPGS)
- EDC Distributed Active Archive Center (DAAC)

The USGS at the EDC will be responsible for the operation and maintenance (O&M) of the IAS during the on-orbit mission operations phase of the Landsat 7 mission.

1.5 IAS Transition Objectives

The objectives of IAS transition activities are to:

- Ensure a smooth phaseover of responsibilities from the GSFC IAS Project (development) to the EDC DHF (operations and maintenance) through coordinated transition activities.
- Deliver a well-tested and acceptable system (IAS) into the Landsat 7 ground segment configuration and mission operations environment.
- Ensure successful O&M of IAS by well-trained EDC DHF personnel after completion of IAS transition.
- Deliver a complete set of as-built IAS documents and configuration and maintenance records to the EDC DHF to ensure successful O&M of the IAS during Landsat 7 mission operations.

The features of the IAS transition approach include:

- Incorporation of IAS transition activities in parallel with IAS development and implementation at EDC DHF
- Thorough transition planning to meet EDC DHF's expectations for supporting IAS operational readiness, Landsat 7 Project's requirements for mission readiness tests (MRTs), and GSFC IAS Project schedules

- Monitoring progress and status of IAS transition activities to ensure they are complete, accurate, and on schedule

The IAS transition activities will be coordinated by the GSFC IAS Project with the EDC DHF and other Landsat 7 Projects (e.g., LPS), as necessary.

The following definitions apply:

- IAS products include items such as documents, hardware, and software programs.
- IAS activities include installation, training, O&M support, etc.

1.6 IAS Implementation Overview

The IAS will be implemented in two incremental releases: Release 1 and Release 2 for the delivery of the system capabilities as specified in the IAS Release Implementation Plan (see Section 2.2) and associated interface control documents (ICDs). One or more maintenance releases will follow Release 2 to make corrections as required to support Landsat 7 MRTs and operational readiness tests (ORTs). The objectives of the IAS releases are as follows:

- IAS Release 1 will support IAS interface testing with the MOC, LPS, and Earth Sciences Data and Information System (ESDIS) EDC DAAC, as available
- IAS Release 2 will meet all IAS functional and performance requirements as described in the baselined IAS Functional and Performance Specifications (see Section 2.2).
- IAS maintenance releases will provide corrections and enhancements, as required, to support the Landsat 7 system integration tests (SITs), mission readiness tests (MRTs), and operational readiness tests (ORTs).

IAS Release 1, when complete, will be installed on an SGI 2000 server for remote access and review by EDC DHF personnel. Pertinent information regarding remote access and review of IAS Release 1 will be provided by the GSFC IAS Project via an E-mail message.

The GSFC IAS Project will demonstrate each IAS release at its completion. EDC DHF personnel are invited to attend these demonstrations at NASA/GSFC. After completion of a Landsat 7 Project review of the IAS Release 2 capabilities, the GSFC IAS Project will submit IAS Release 2 to EDC DHF personnel to conduct a factory acceptance test (FAT) at GSFC. On successful completion of the FAT, as concurred and/or verified by EDC DHF personnel at the consent-to-ship review (CSR), the GSFC IAS Project will ship the as-tested IAS to the EDC DHF. IAS hardware with Release 2 software loaded will be shipped to the EDC DHF. Sufficient hardware will be retained at GSFC to permit ongoing maintenance support and CM.

The GSFC IAS Project will install and check out the IAS in concert with EDC DHF personnel after its arrival at the EDC. EDC DHF personnel will then perform a site acceptance test (SAT) of the IAS. IAS external interface tests with other Landsat 7 systems (i.e., MOC, LPS, and EDC DAAC) can be conducted during the SAT and/or during the SIT and MRT, as appropriate.

1.7 IAS Transition Overview

The following overview of the transition of the IAS to the EDC DHF briefly describes the three IAS transition phases and what is expected to occur during each phase.

IAS Transition Planning begins at IAS critical design review (CDR) and ends at IAS Release 1 software delivery. The GSFC IAS Project and the EDC DHF will complete all transition planning activities required in the areas of facility and installation preparation and acceptance testing during this phase. The EDC DHF may initiate third-party or vendor training for its staff as necessary.

IAS Transition begins with the completion of the IAS transition planning phase and ends at operational readiness review (ORR). EDC DHF personnel assume responsibility for IAS operations and for system administration, configuration management (CM), and maintenance for the IAS commercial off-the-shelf (COTS) software and hardware. The GSFC IAS Project will make IAS developed software source code available, at the completion of ORR, to EDC DHF personnel for developing and delivering a maintenance and/or operations release after the Landsat 7 launch, under supervision of the GSFC IAS Project.

Transition Close-out begins with the successful completion of the IAS transition phase at ORR and ends at launch +90 days after a final acceptance review (FAR). The GSFC IAS Project turns over all IAS records and configuration control responsibility for the IAS developed application software before the close-out is completed. The GSFC IAS Project continues to perform CM and maintenance and to review and support maintenance activities performed by EDC DHF personnel until launch +90 days. Afterward, EDC DHF personnel assume full responsibility for operating, maintaining, and managing the IAS configuration.

1.8 Assumptions

The IAS transition plan is based on the following assumptions:

Role of EDC:

1. The EDC IAS Project will provide the IAS Geometric Processing Subsystem to the GSFC IAS Project for integration with other subsystems in two builds. Build 1 will be provided July 1, 1997. Build 2 will be provided September 12, 1997. After integration with other subsystems, the Geometric Processing Subsystem will be subject to the same CM procedures as all other IAS developed software. EDC will perform maintenance on the GPS throughout development, integration, testing and operations.

2. The EDC DHF will arrange vendor training courses identified in this plan for EDC DHF personnel.

CM Through Site Acceptance Test:

3. The GSFC IAS Project Configuration Management Board (PCMB) will be responsible for assigning, prioritizing, and approving the resolution of all CCRs until the IAS-to-EDC

DHF software turnover. The EDC DHF will arrange with the GSFC IAS Project to attend PCMB meetings.

4. All IAS problems that result in a configuration change request (CCR) through transition close-out will be logged using the CCR tracking procedure maintained by the GSFC IAS Project on the Interactive CCR Automation System (ICAS) tool.

5. The GSFC IAS Project will provide ICAS remote access privileges to the EDC DHF organization for creating and monitoring CCRs.

CM After Site Acceptance Test:

6. The EDC DHF becomes responsible for controlling changes to IAS COTS hardware and software configurations after the IAS SAT.

7. The GSFC IAS Project shall retain configuration management (CM) responsibilities for all IAS developed software until the IAS-to-EDC DHF software turnover at launch +90 days.

8. The GSFC IAS Project will retain CM control over IAS developed software beyond IAS site acceptance testing.

9. The GSFC IAS Project will turn over IAS developed software CM control responsibilities to the EDC DHF at launch +90 days.

Testing:

10. The Landsat 7 Project is responsible for planning, designing, scheduling, and conducting all SITs and MRTs.

Testing Before CSR:

11. The GSFC IAS Project will coordinate with the Landsat 7 Project for conducting MRTs that may be performed before CSR.

Testing After CSR/SAT:

12. EDC DHF personnel are responsible for supporting and/or conducting SITs and MRTs after IAS site acceptance testing at EDC.

13. With support from the Landsat 7 Project, EDC DHF personnel conduct ORTs and operational readiness simulations that culminate in an ORR conducted jointly by the Landsat 7 Project and the EDC DHF.

14. The GSFC IAS Project will make available IAS developed software source code to EDC DHF personnel at ORR after completion of the Landsat 7 ground system SITs and MRTs.

Maintenance (post SAT):

15. The EDC DHF assumes maintenance support for all IAS COTS hardware, software, and firmware items after the IAS SAT. It is assumed that the EDC DHF will organize a Configuration Control Board (CCB) and the GSFC IAS Project will have representation on the board.

16. The GSFC IAS Project will perform maintenance and CM control over IAS developed software after IAS site acceptance testing. The GSFC IAS Project will maintain CM control over IAS software through maintenance release(s), developed and delivered by the

GSFC IAS Project, and at least one operations and/or maintenance release to be developed and delivered by the EDC DHF after ORR.

17. The GSFC IAS Project will establish primary points of contact to investigate and resolve trouble calls from the EDC DHF through launch +90 days. Trouble calls will be restricted to error correction. Requests for enhancements will be treated as new development work.

18. EDC DHF personnel will allow sufficient privileges to GSFC IAS Project personnel to continue performing IAS software maintenance activities via remote access through launch +90 days.

19. To perform postlaunch maintenance or support EDC DHF postlaunch maintenance, the GSFC IAS Project will have access to a spare Origin 2000 platform in the development environment and to the Landsat I&T System Origin 2000 platform at EDC DHF until launch+90 days.

Closeout:

20. With support from the GSFC IAS Project, the EDC DHF will develop and deliver a maintenance and/or operational release after the Landsat 7 launch, but prior to the FAR. The intent of this release is to allow EDC DHF personnel to successfully develop, test, and deliver an IAS software release while GSFC IAS Project personnel are available for consultation.

21. The EDC DHF will conduct a FAR of the IAS before launch +90 days.

22. The EDC DHF will be responsible for transitioning maintenance records from the ICAS system to the TBD system used by EDC DHF for maintenance tracking.

23. The EDC DHF will be fully responsible for all aspects of system administration, maintenance, and CM at launch +90 days.

Section 2—Applicable Documents

The following documents contain applicable and reference information regarding the IAS, the Landsat 7 system, and the IAS transition plan. If there are conflicts between the listed document and the requirements of this plan, this transition plan takes precedence.

2.1 Applicable Documents

1.NASA/GSFC/MO&DSD, Landsat 7 Processing System Project Management Plan (PMP), Revision 1, May 1995

2.—, *Landsat 7 Image Assessment System Release Implementation Plan (RIP)*, April, 1997 (Draft)

3.—, *Landsat 7 Image Assessment System Integration and Test (I&T)*,

4.—, Code 500, *Landsat 7 Ground System Master Mission Schedule*

5.EDC, *EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS*, July, 1996 (Signature)

6.—, *Landsat 7 Image Assessment System Acceptance Test Criteria*, July 1996 (Review)

2.2 Reference Documents

1.NASA/GSFC/MO&DSD, *Landsat 7 Image Assessment System (IAS) Functional and Performance Specification (F&PS)*,

2.—, *Landsat 7 Image Assessment System (IAS) System Design Specification*,

3.—, *Landsat 7 Image Assessment System (IAS) Critical Design Specification*,

4.—, *Landsat 7 Image Assessment System (IAS) Users Guide*,

5.—, *Landsat 7 Image Assessment System (IAS) Operations and Maintenance Manual*,

6.NASA/GSFC, *Landsat 7 Detailed Mission Requirements*, May 15, 1995

7. MO&DSD, *Mission Operations Concept Document for the Landsat 7 Ground System*, June 5, 1995

8.NASA/GSFC/MO&DSD, *Landsat 7 Ground System Performance Verification Plan (PVP)*, November 1995

9.—, *Landsat 7 Ground System (GS) Integration and Test Plan (I&TP)*, 510-2ITP/0395, October 1995

10. —, *Systems Management Policy*, MDOD-8YMP/0485, July 1986

Section 3—IAS Transition Phases and Activities

3.1 IAS Transition Phases

This section defines IAS transition phases and their activities. The IAS transition to operations takes place incrementally in parallel with IAS development and delivery of releases. The IAS Release Implementation Plan (RIP) (see Section 2.1) defines the capabilities of each planned IAS release. The schedule and scope of the IAS maintenance releases will be planned as needed, given upcoming tests and CCRs. Figure 3–1 shows a timeline of IAS transition phases and activities based on the IAS implementation plan and derived from *Landsat 7 Ground System Master Mission Schedule* (see Section 2.1.4). The IAS transition activities are divided into three phases:

1. Transition planning
2. IAS transition
3. Transition close-out

The following three subsections provide an overview of the activities performed during each IAS transition phase. Details on IAS transition activities are provided in subsequent sections. Figure 3–2 provides a matrix of responsibilities that are transferred from the GSFC IAS Project to the EDC DHF organization at various IAS transition milestones. Table 3-1 provides a list of transition related products that are the responsibility of the GSFC IAS Project or the EDC DHF.

3.1.1 IAS Transition Planning Phase

This phase encompasses IAS development and system test activities, begins after IAS CDR, and culminates with the delivery of IAS Release 1. All IAS transition planning activities are expected to be complete during this phase. The IAS Transition Plan, Installation Procedure, and O&M Manual are to be completed by the GSFC IAS Project during this phase. IAS vendor training begins near the end of this phase. The IAS Acceptance Test Criteria; EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS; and EDC Landsat 7 Data Handling Facility Operations Support Plan are available from the EDC DHF during this phase. Also, a Mission Readiness Test Plan and Procedures will be produced by the Landsat 7 Project. All of these documents are listed in Section 2.1

IMAGE ASSESSMENT SYSTEM TRANSITION SCHEDULE

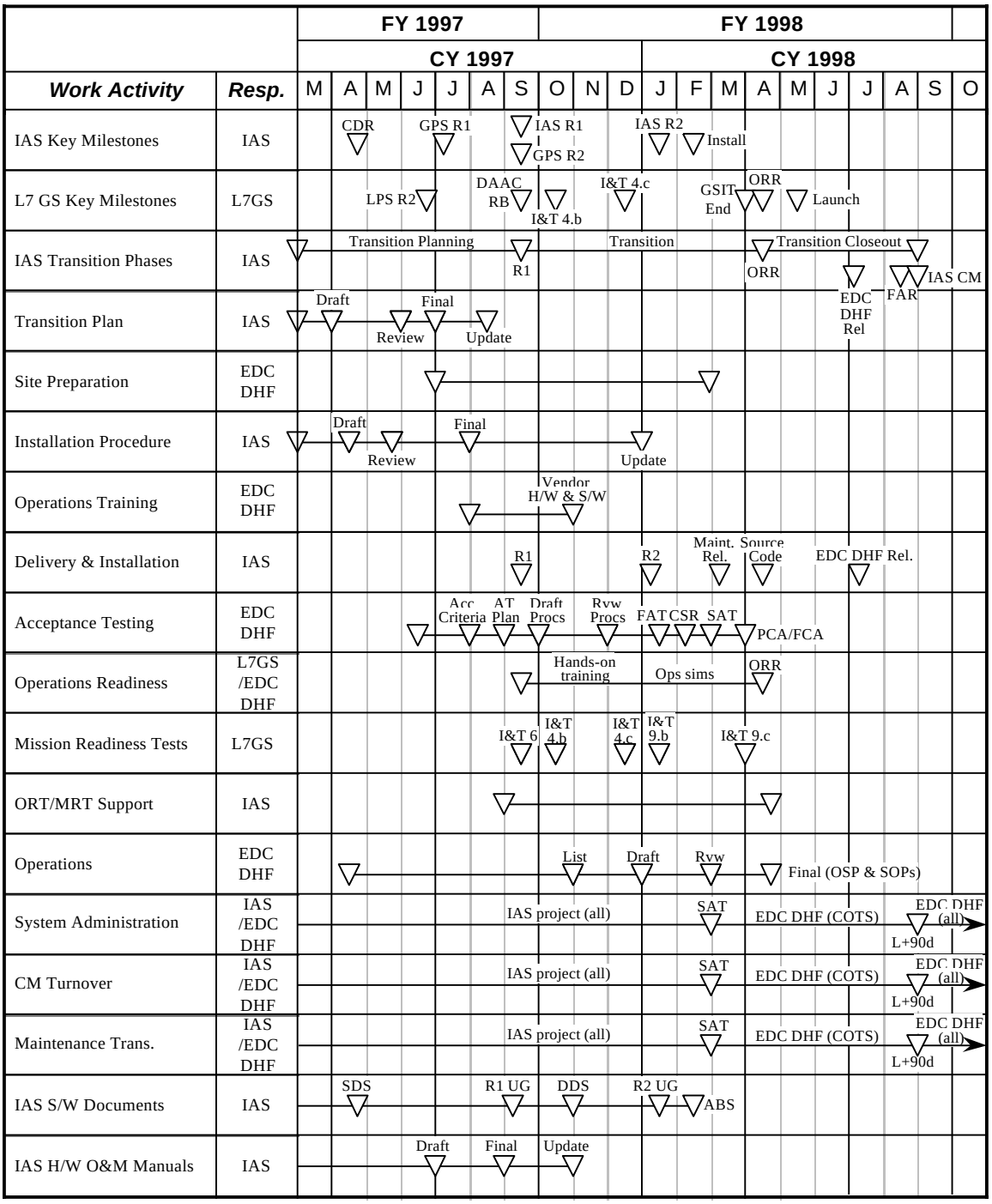

Figure 3-1: IAS Transition Schedule

Activity	Resp.	CDR	Rel 1	Rel 2	SAT	ORR	Launch	L+60	L+90
Site Preparation	GSFC								
	EDC DHF								
Training	GSFC								
	EDC DHF								
Acceptance Testing	GSFC					Maintenance Releases			
	EDC DHF								
Installation	GSFC								
	EDC DHF								
System Administration.	GSFC								
	EDC DHF			(EDC COTS)					
Maintenance	GSFC								
COTS H/W & S/W	EDC DHF								
Maintenance	GSFC								
IAS Software	EDC DHF								
CM	GSFC								
COTS H/W & S/W	EDC DHF								
CM	GSFC								
IAS Software	EDC DHF								
MRTs and ORTs	GSFC								
	EDC DHF								
Operations	GSFC								
	EDC DHF								
Legend:									
Prime Activity									
Related Activity									
(Plan/Review/Support/Learn)									
All events show completion of indicated activities.									

Figure 3-2 IAS Transition Responsibilities

Table 3-1. IAS Transition-Related Products

From GSFC IAS Project:	
Product	Planned Completion Date
1. IAS Release 1	September 12, 1997
2. IAS Release 2	January 16, 1998
3. Transition Plan	Review May 27, 1997; Final July 1, 1997
4. Installation Procedure	Review May 27, 1997; Final July 1, 1997
5. Source Code	April 1998 (ORR)
6. COTS Vendor Documentation	February, 1998 (completion of SAT)
7. System Design Specification	March, 1997
8. Release 1 Users Guide	September, 1997
9. Critical Design Specification	Review July 29,1997; Final September, 1997
10. Release 2 Users Guide	January, 1998
11. Operations & Maintenance Manual	TBD
12. IAS Maintenance Release	March, 1998 (post SAT)
13. Maintenance Records	August, 1998 (L+90 days)
From EDC DHF:	
Product	Planned Completion Date
1. IAS Maintenance Release	July, 1998 (between ORR and FAR)
2. Site Preparation Plan (Update)	TBD
3. Acceptance Criteria	TBD
4. Acceptance Test Plan	TBD
5. Acceptance Test Procedures	TBD
7. FAT	January, 1998
8. CSR	February, 1998
9. SAT	March, 1998
10. OSP	May, 1997
11. SOPs	August, 1997
12. ORR	April, 1998

3.1.2 IAS Transition Phase

This phase begins at the completion of the IAS transition planning phase (delivery of IAS Release 1) and ends at Landsat 7 Ground System ORR. This is the primary transition activities phase during which IAS system responsibilities are gradually turned over from the GSFC IAS Project to the EDC DHF. Several IAS transition activities, including IAS training, factory acceptance testing, installation at the EDC DHF, site acceptance testing, interface testing with other Landsat 7 systems, integration into Landsat 7 mission operations, and transfer of IAS system administration and CM responsibilities (for IAS COTS software and hardware only) are completed during this phase. The IAS software source code, users guide, critical design specification, programmer's reference manual and maintenance release(s) also are provided to the EDC DHF. The IAS standard operating procedures (SOPs) and maintenance procedures are completed by the EDC DHF.

3.1.3 Transition Close-out Phase

This phase begins at ORR and ends on day 90 after the Landsat 7 launch (i.e., launch +90 days). EDC DHF personnel are responsible for all IAS activities, except IAS developed software maintenance and CM, during this phase. Although they do not have full maintenance responsibility during this phase, EDC DHF personnel plan and prepare one or more maintenance releases for IAS operations, with assistance from the GSFC IAS Project. The IAS developed software maintenance and CM responsibility is turned over to the EDC DHF at launch +90 days.

The GSFC IAS Project completes the IAS-to-EDC DHF handover by providing all IAS records and documents to the EDC DHF organization during this phase. The EDC DHF holds an FAR of the IAS before launch +90 days. The EDC DHF becomes solely responsible for the IAS at the end of this phase.

3.2 Transition Planning Activities

The following activities are performed during transition planning:

- Facility planning and preparation
- Installation planning and preparation
- Acceptance test planning

The following sections provide additional details on IAS transition planning activities.

3.2.1 Training Planning and Preparation

It is expected that EDC DHF personnel will complete all arrangements for taking COTS hardware and software vendor training courses during the IAS transition planning phase. Depending on vendor training schedules, some training could also begin in the IAS transition planning phase. EDC DHF personnel should complete all recommended vendor and COTS training courses during the early part of the IAS transition phase. The EDC DHF is responsible for arranging vendor training courses, recommended by the GSFC IAS Project, directly with the IAS COTS hardware and software vendors.

Provision of additional IAS-specific training by the GSFC IAS Project is TBD.

3.2.1.1 Vendor Training Courses

The GSFC IAS Project recommends that EDC DHF personnel take the following vendor training courses to support IAS transition activities:

- SGI Origin 2000 System Administration
- SGI Origin 2000 Advanced System Administration
- SGI Origin 2000 Network Administration
- SGI Onyx Maintenance
- SGI Introduction to IRIX
- ORACLE Relational Database Administration I (DBA I)
- ORACLE Relational Database Administration II (DBA II)
- ORACLE Relational Database Application Development
- ORACLE Relational Database Tuning and Troubleshooting

The primary objective of EDC DHF personnel in taking these courses is to learn the functional and performance capabilities and operational features of the various COTS hardware and software items used in IAS implementation. It is possible that some EDC DHF personnel are already trained in the use of the IAS COTS products.

3.2.1.2 IAS Operations Training Course

TBD

3.2.1.3 IAS Maintenance Training Course

TBD

3.2.2 Facility Planning and Preparation

The EDC DHF is responsible for planning the IAS area at the EDC DHF. The EDC Site Preparation Plan, prepared by the EDC DHF, will contain details on the IAS facility design; the IAS equipment layout in the Landsat 7 mission operations area; power, grounding, and cooling arrangements; and a schedule for preparing the facility for IAS installation. It is expected that the EDC DHF will complete all IAS facility preparations at least 2 weeks before IAS FAT. The EDC DHF will provide the IAS facility readiness status at the IAS CSR, which is held after IAS FAT. This will allow the GSFC IAS Project to verify and/or update IAS installation drawings and procedures in accordance with the as-built facility and/or facility changes, if any. The IAS facility planning and preparation schedule is shown in Figure 3–1.

3.2.3 Installation Planning and Preparation

The GSFC IAS Project is responsible for planning the installation of IAS at the EDC DHF. The IAS Installation Procedure outlines the installation activities to be performed by GSFC IAS Project personnel for installing IAS in the Landsat 7 mission operations area at the EDC DHF. The IAS Installation Procedure will be designed to meet the physical location, power, grounding, and cabling requirements and constraints specified in *EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS*. All IAS hardware, software, and cables to be installed at the EDC DHF will be identified in the IAS Installation Procedure and/or the O&M manual. The GSFC IAS Project will ensure that all material and products required for IAS installation are identified and procured during the early part of the IAS transition period. Support and material (e.g., furniture, storage racks) required from the EDC DHF will be identified in this plan. This plan will include equipment checkout procedures (e.g., startup, shutdown, and installation verification checks and tests) to ensure the operational readiness of each IAS component before it is turned over to the EDC DHF. The schedule for IAS installation activities is shown in Figure 3–1.

3.2.4 Acceptance Test Planning

The EDC DHF organization is responsible for planning and conducting the IAS FAT at GSFC and the SAT at the EDC DHF. The IAS Acceptance Plan will outline the EDC DHF minimum requirements and criteria for accepting the IAS on delivery and installation at the EDC DHF. The EDC DHF will review and negotiate IAS acceptance requirements and criteria with the GSFC IAS Project during the IAS transition planning phase. It is expected that this plan will be finalized at least 3 months before FAT. The GSFC IAS Project will use the results of the IAS FAT, presented and/or discussed at the CSR, in its decision to ship the IAS to the EDC DHF. Similarly, the GSFC IAS Project will use the results of the IAS FAT and SAT, performed by the EDC DHF, as the basis for turning over the IAS COTS items administration, operations, and maintenance responsibilities to the EDC DHF. The IAS acceptance activities and schedule are shown in Figure 3–1.

3.3 IAS Transition Activities

IAS transition phase activities are as follows:

- Review IAS Release 1
- Complete IAS training
- Conduct FAT
- Deliver and install IAS
- Conduct SAT
- Conduct maintenance release test
- Conduct physical configuration audit (PCA) and functional configuration audit (FCA)
- Conduct MRTs
- Conduct ORTs
- Provide testing support
- Prepare for IAS operations
- Prepare for IAS maintenance
- Perform IAS CM

Each of the preceding activities is discussed in one of the following subsections.

3.3.1 Review IAS Release 1

IAS Release 1 will be completed during the early part of the IAS transition phase. The GSFC IAS Project will keep EDC DHF personnel informed of the status of IAS Release 1 verification test activities. The GSFC IAS Project will demonstrate the IAS Release 1 capabilities after successful completion of the verification tests. EDC DHF personnel will be invited to attend this demonstration. The GSFC IAS Project will set up login accounts for requested EDC DHF personnel for remote access and evaluation of IAS Release 1 capabilities. IAS Release 1 will not be installed at the EDC DHF.

3.3.2 Complete IAS Training

All IAS vendor training is completed during the IAS transition phase.

IAS-specific training to be provided by the GSFC IAS Project is TBD.

3.3.3 Conduct Factory Acceptance Test

After successful system test of IAS Release 2, EDC DHF personnel will begin factory acceptance testing of the IAS. The GSFC IAS Project will configure IAS for IAS FAT and provide system administration and CM services as required. All FAT procedures will be developed by the EDC DHF. The GSFC IAS Project will provide review and consulting support to EDC DHF personnel during the preparation of these procedures. If desired and requested by the EDC DHF, the GSFC IAS Project will provide selected test data, test procedures, and test tools that have been developed for IAS release testing for preparing the IAS FAT procedures.

The EDC DHF FAT team will consult the GSFC IAS Project in categorizing the problems encountered during the FAT and logging them into the ICAS problem-tracking tool. The GSFC IAS Project or the EDC DHF FAT Team will log these IAS problems using the CCR procedures established on the ICAS. The GSFC IAS Project can provide electronic or hardcopies of the IAS FAT problem reports to the EDC DHF. After completion of the FAT, EDC DHF personnel will review the results with the GSFC IAS Project at CSR. On successful completion of the FAT, the EDC DHF FAT director will provide his/her concurrence at CSR for shipping the IAS to the EDC DHF. The IAS FAT schedule is shown in Figure 3–1.

3.3.4 Deliver and Install IAS

The GSFC IAS Project will deliver the IAS hardware and Release 2 software to the EDC DHF after successful completion of the FAT.

EDC DHF personnel are responsible for receiving the IAS at the EDC DHF. The GSFC IAS Project will assign personnel to install the IAS as specified in the Landsat 7 EDC Site Preparation Plan and IAS Installation Procedure. A 1-week period is allocated for completing this installation. The IAS delivery and installation activity schedule is shown in Figure 3–1.

Following successful installation and checkout, the IAS will be available to support hands-on operations training and to dry run IAS SAT procedures. If necessary, the GSFC IAS Project will work out a daily schedule with EDC DHF personnel for sharing the IAS between acceptance test preparation and IAS training activities. As a general rule, IAS SAT preparation activities will have precedence over IAS training for accessing IAS resources.

The EDC DHF is responsible for assigning an EDC DHF person to support and coordinate IAS installation activities of GSFC IAS Project personnel throughout this activity.

3.3.5 Conduct IAS Site Acceptance Test

EDC DHF personnel will be responsible for conducting an IAS SAT in accordance with the acceptance test plan and procedures reviewed and concurred by the GSFC IAS Project. The GSFC IAS Project will assign a representative to attend IAS site acceptance testing and witness the results. The EDC DHF acceptance test director may request the GSFC IAS Project representative to review test results during the test and to clarify any problems encountered during the acceptance test. The EDC DHF SAT director will conduct an IAS acceptance test briefing at the end of the SAT. All problems encountered

during the acceptance test will be categorized and logged by the EDC DHF using ICAS procedures. The IAS acceptance criteria, described in the IAS Acceptance Plan, will be used to assess the severity of IAS problems and to decide on the full, partial, and/or conditional acceptance of the IAS and/or IAS capabilities . A schedule for resolving all problems will be negotiated between the GSFC IAS Project and the EDC DHF after the IAS acceptance test briefing.

At the completion of IAS SAT, the EDC DHF will assume the system administration responsibility for all IAS COTS software and hardware items. Table 3-2 indicates the transition of maintenance for COTS software and hardware from the GSFC IAS Project to the EDC DHF.

Table 3-2. IAS COTS Software and Hardware Maintenance Transition

Item	Vendor	End Date for GSFC IAS Project Maintenance Agreement
Hardware		
1. Origin 2000 Server	SGI	
2. Origin O2 Workstations (3)	SGI	
3. RAIDs (2)	Ciprico	
4. DLT	Boxhill	
5. Printer		
6. Ethernet Hub		
7. FDDI		
COTS Software		
1.RTM		
2. Teamwork		
3. Designer 2000		
4. Pro*C Dev/KDebugger		
5. IDL		
6. SQLPlus		
7. Purify		
8. RPS		
9. PVCS		
10. ENVI		
11. Framemaker		
12. Netscape		
13. Statistics Package		

The GSFC IAS Project will continue to provide system administration consulting support to EDC DHF until Landsat 7 ORR.

3.3.6 Conduct Maintenance Release Test

After installation, EDC DHF will provide sufficient remote access to the installed IAS to allow the GSFC IAS Project to perform maintenance and testing. The GSFC IAS Project has tentatively planned an IAS maintenance release to deliver corrections to problems discovered during the IAS acceptance test. If required, the GSFC IAS Project will deliver additional maintenance releases. A tentative schedule for the IAS maintenance release is shown in Figure 3–1. When delivered, the IAS maintenance release will be acceptance tested by the EDC DHF using acceptance procedures baselined at the beginning of the IAS acceptance test. The IAS maintenance release will be used by the EDC DHF to verify that the IAS problems encountered during acceptance testing and assigned to this release are satisfactorily corrected by the GSFC IAS Project.

3.3.7 Conduct Physical and Functional Configuration Audits

The GSFC IAS Project and the EDC DHF will conduct a joint PCA/FCA of the IAS after completion of the acceptance test. The GSFC IAS CM representative will be responsible for supporting these audits by the EDC DHF CM representative. The summary results of these audits will be included in the final acceptance records of the IAS. All discrepancies noted during these audits will be logged using the ICAS problem reporting procedures tool.

3.3.8 Conduct Mission Readiness Tests

The Landsat 7 Project plans to conduct a number of SITs and MRTs to ensure the integration of the various software releases, hardware configurations, and operations scenarios into the Landsat 7 ground segment. The Landsat 7 MRT schedules are documented in *Landsat 7 Ground System Master Mission Schedule*. A tentative schedule for IAS applicable SITs and MRTs is shown in Figure 3–1.

The IAS participation in the Landsat 7 SITs and MRTs will start with the delivery of IAS Release 1 and end with end-to-end testing of the Landsat 7 ground segment. During this period, IAS Release 1 will be tested to interface with the MOC and DAAC. After IAS Release 2 is successfully developed, the IAS will be tested for the full complement of process control, data management, and user interface capabilities, as well as custom evaluation and analysis tools. The GSFC IAS Project will support these tests throughout the IAS-to-EDC DHF transition. The Landsat 7 Project is responsible for scheduling and coordinating these tests with the LPS, EDC DHF, and all other Landsat 7 ground systems.

3.3.9 Conduct Operational Readiness Tests

The Landsat 7 ground segment and the EDC DHF are responsible for preparing for and conducting mission ORTs and operational readiness simulations. The Landsat 7 Project will prepare the mission operations plan and procedures and provide Landsat 7 ground segment operations training, including hands-on training, to EDC DHF personnel. The Landsat 7 Project will conduct operations simulations to help improve the operational skills of EDC DHF personnel, as well as verify operational capabilities

of the integrated ground segment. The IAS and ground segment operational readiness preparations and simulations will culminate with an ORR.

The Landsat 7 Project, with support from the EDC DHF and GSFC IAS Project, will complete ORT procedures during the IAS transition phase. These procedures may selectively include the IAS procedures used in IAS acceptance tests. The Landsat 7 Project and EDC DHF test directors may also enhance and modify IAS acceptance test procedures to adapt them to the ORT environment and simulations. GSFC IAS Project personnel will provide consultation support to the Landsat 7 Project and the EDC DHF throughout the ORT and operational readiness simulation activities. A tentative schedule of Landsat 7 readiness activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

EDC DHF operations personnel will be responsible for conducting IAS ORT in coordination with other Landsat 7 systems and external interfaces. GSFC IAS Project personnel will be on hand to review test results and support analysis of the problems encountered during ORT. All problems encountered during the test will be logged using ICAS problem-reporting procedures. The GSFC IAS Project also will assist the EDC DHF in resolving ORT problems, as appropriate.

The GSFC IAS Project will assist EDC DHF operations in preparing the IAS for use in the ORT environment. At a minimum, the following activities will be performed:

- Load operational databases and verify contents.
- Establish and verify operational mission interfaces.
- Support end-to-end tests, simulations, and ORT-related tests.

3.3.10 Provide Testing Support

The GSFC IAS Project will provide IAS testing support starting at IAS acceptance testing through the end of ORT. This support includes providing reviews of test procedures, IAS preparation for ORT, and review of test results and problems.

3.3.11 Prepare for IAS Operations

The EDC DHF will prepare an Operations Support Plan and SOPs for normal and contingency IAS operations. The GSFC IAS Project will provide consulting support to EDC DHF operations in preparing the Operations Support Plan and SOPs. The EDC DHF operations organization will be responsible for validating and approving all IAS SOPs. A tentative schedule of IAS operations planning activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

The GSFC IAS Project expects that most EDC DHF operations personnel will have completed vendor training courses in COTS hardware and software before IAS factory acceptance. These training courses are expected to assist EDC DHF operations personnel in effectively preparing for the IAS FAT and in reviewing the installation activities at the EDC DHF. With the arrival of the IAS equipment at the EDC

DHF, the GSFC IAS Project will begin meeting with EDC DHF personnel daily to review IAS activities. These meetings will serve as a communications mechanism for IAS transition activities .

The GSFC IAS Project plans to turn over the IAS COTS software and hardware administration responsibilities to EDC DHF operations as soon as possible after completion of all vendor training and the IAS SAT. The GSFC IAS Project will continue to provide backup system administration and consulting support, as required, for all IAS COTS software and hardware until launch +90 days.

3.3.12 Prepare for IAS Maintenance

EDC DHF personnel are responsible for preparing for IAS hardware and software maintenance to support Landsat 7 mission operations. In accordance with Landsat 7 ground segment guidelines and/or the IAS maintenance philosophy, the EDC DHF will prepare *EDC Landsat 7 Data Handling Facility Operations Support Plan* and *IAS Standard Operating Procedures*. These documents will define how the EDC DHF plans to procure and retain vendor maintenance and software upgrade or licensing agreements, perform in-house maintenance, and stock spares to maintain all IAS COTS and custom software and hardware items throughout the Landsat 7 mission.

The GSFC IAS Project expects senior EDC DHF maintenance personnel to be on hand to discuss and begin IAS maintenance transition activities soon after SAT. After completion of the IAS PCA and FCA, the GSFC IAS Project will turn over all COTS products maintenance agreements and licensing responsibilities, along with IAS COTS system administration responsibilities, to EDC DHF personnel. The GSFC IAS Project will continue to provide backup maintenance and/or consulting support to the EDC DHF on all IAS COTS software and hardware items until launch +90 days. The GSFC IAS Project will make available the IAS developed application software source code to EDC DHF personnel at ORR. After ORR, EDC DHF personnel will assume additional responsibilities for IAS software maintenance under the guidance of the GSFC IAS Project.

The GSFC IAS Project will provide consultation support to the EDC DHF in drafting a maintenance plan and the corrective and preventive maintenance procedures for IAS. It is recommended that IAS maintenance procedures be drafted by the EDC DHF after completion of all training in IAS COTS software and hardware. The EDC DHF maintenance organization will be responsible for validating and approving all IAS maintenance procedures. A tentative schedule of Landsat 7 and IAS maintenance preparation activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

3.3.13 Perform IAS Configuration Management

The GSFC IAS Project will retain CM responsibilities for the IAS application software beyond ORR until launch +90 days. This facilitates rapid software patches, if necessary, by the GSFC IAS Project while permitting EDC DHF personnel to prepare for the software turnover without the stress of making mission-critical software deliveries. At launch +90 days, the EDC DHF becomes fully responsible for IAS software maintenance and CM.

3.4 Transition Close-out Activities

The IAS transition close-out activities include

- Attending the Landsat 7 ORR
- Reviewing and supporting IAS release(s) by the EDC DHF
- Supporting IAS-to-EDC DHF software CM turnover
- Attending the IAS FAR

Each of the preceding activities is described in one of the following subsections.

3.4.1 Attend Landsat 7 Operational Readiness Review

The EDC DHF will conduct an ORR after completion of Landsat 7 MRTs and ORTs. The GSFC IAS Project will support and participate, as required, in the conduct of this review. It is expected that all problems discovered during MRT and ORT are satisfactorily resolved by ORR. If a problem cannot be solved by ORR and the problem is deemed mission critical, a work-off plan shall be presented at ORR.

3.4.2 Review and Support IAS Release(s) by EDC DHF

The GSFC IAS Project will make the IAS software available to the EDC DHF maintenance organization at ORR. EDC DHF personnel will have an opportunity to exercise IAS maintenance skills to develop an IAS maintenance or operational release before the Landsat 7 launch. The GSFC IAS Project will work with EDC DHF maintenance personnel in the construction of their first release to ensure that it is successfully delivered to EDC DHF operations. Additional operational releases, if required by IAS operations, will give the EDC DHF maintenance organization sufficient experience and confidence to effectively maintain and manage IAS software, without GSFC IAS Project support, after the IAS transition close-out is complete at launch +90 days.

3.4.3 Support IAS-to-EDC DHF Software CM Turnover

EDC DHF personnel will acquire hands-on IAS CM experience beginning with the first EDC DHF maintenance release to Landsat 7 operations. The GSFC IAS Project will gradually phase the EDC DHF organization into routine IAS CM activities during the course of the close-out period. The GSFC IAS Project will turn over IAS CM responsibilities to the EDC DHF at launch +90 days. EDC DHF personnel will convert maintenance records from the ICAS tool to the TBD system that they will use to track software maintenance.

3.4.4 Attend IAS Final Acceptance Review

The GSFC IAS Project will attend an IAS FAR with EDC DHF personnel at least 2 weeks before the IAS close-out to review the status of IAS acceptance and transition activities and to turn over all IAS software and IAS design, development, test, and maintenance records to the EDC DHF. The objective of this meeting would be to make sure that EDC DHF personnel have access to and understand the issues, if any, associated with each IAS record item or a mission support document. The GSFC IAS Project will deliver two sets of electronic copies and two sets of hardcopies for the as-built versions of the following IAS documents and/or records:

- IAS Users Guide
- IAS O&M Manual
- IAS Programmers Reference Guide
- IAS Critical Design Specification
- IAS Interface Detailed Description Documents
- IAS Data Format Control Book
- IAS ICDs (DAAC, MOC, and LPS)
- IAS system test results and test data
- IAS diagnostics and checkout scripts (engineering version as appropriate)
- IAS COTS item maintenance and/or licensing agreements (as appropriate)

The GSFC IAS Project will ensure that copies of all IAS records and documents are available to EDC DHF operations and maintenance personnel during the IAS transition phase. In addition to documentation, the GSFC IAS Project will provide Cadre Teamwork files prepared during design of the IAS. Figure 3–1 shows a schedule for completing key IAS documents needed for O&M. The GSFC IAS Project recommends that the EDC DHF provide comments and corrections, as appropriate, to these documents by ORR. This will enable the GSFC IAS Project to deliver the as-built updated IAS documents to EDC DHF by launch +90 days.

With the turnover of the final IAS records and documents, the EDC DHF will become fully responsible for all IAS maintenance (i.e., hardware, software, and firmware).

Acronyms

CCB	Configuration Control Board
CCR	configuration change request
CDR	critical design review
CM	configuration management
COTS	commercial off-the-shelf
CSR	consent-to-ship review
DAAC	Distributed Active Archive Center
DCN	document change notice
EDC	EROS Data Center
EROS	Earth Resources Observation System
ESDIS	Earth Sciences Data and Information System
ETM+	Enhanced Thematic Mapper Plus
FAR	final acceptance review
FAT	factory acceptance test
FCA	functional configuration audit
F&PS	functional and performance specification
GSFC	Goddard Space Flight Center
GPS	Geometric Processing System
HPDI	High Speed Parallel Digital Interface
IAS	Image Assessment System
ICAS	Interactive CCR Automation System
ICD	interface control document
IDPS	Image Data Processing Subsystem
LDTS	LPS Data Transfer Subsystem
LGS	Landsat Ground Station
LPGS	Level 1 Product Generation System
LPS	Landsat 7 Processing System
MACS	Management and Control Subsystem
MFPS	Major Frame Processing System
MO&DSD	Mission Operations and Data Systems Directorate
MRT	mission readiness test
NASA	National Aeronautics and Space Administration
O&M	operations and maintenance
ORR	operational readiness review
ORT	operational readiness test
PCA	physical configuration audit
PCD	payload correction data

PCDS	PCD Processing Subsystem
PCMB	Project Configuration Management Board
RIP	Release Implementation Plan
RDCS	Raw Data Capture Subsystem
RDPS	Raw Data Processing Subsystem
SAT	site acceptance test
SGI	Silicon Graphics, Inc.
SIT	system integration test
SOP	standard operating procedure
TBD	to be determined
TBR	to be resolved
TBS	to be supplied
USGS	U.S. Geological Survey